

'Text comparison software for students': an educational development tool or quick 'text checker' – examining student use and perceptions of value

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Abstract

Many universities offer their students access to text-comparison software. This is typically done as a means of engendering a strong sense of academic integrity across the student community, encouraging the development of good academic writing practices, and to help students become more aware of general issues associated with plagiarism. However, very few institutes have carried out follow-up studies to determine whether this is indeed the case, or whether the students simply use the software to avoid being 'caught'.

Added to this lack of understanding of how students actually use text comparison software, is a lack of awareness of the role and influence of the academic in this process. Depending on how the software is presented to students, it can either be viewed as a formative learning tool that will engage them in a meaningful pedagogically-led discussion about their understanding, synthesis and critique of the academic literature, or as a deterrent, designed with the academic in mind to help reduce the number of cases that require some level of formal action.

Following an institutional wide review of its plagiarism policy and procedures, the UK Open University (UKOU) set about investigating whether text-comparison software specifically aimed at student use, could be integrated across the university. Given the potential scale at which this would need to operate (e.g. ~260 000 global undergraduate and postgraduate students, studying in an online and distance education environment, on ~570 modules, each assessed by a varying number of assignments), a low-resource solution was needed to ensure it could meet on-going management costs, be rolled out easily and effectively, and fulfil an educational development remit, rather than becoming a 'quick check' tool.

This paper reports some of the preliminary findings of a pilot study involving postgraduate Science students, examining how and when they used the text-comparison software, as well as evaluating their perceptions of this tool in terms of its value to their learning. As well as the quantitative data on actual student usage, the paper presents some initial qualitative data based on student perception of how this tool has added to their learning development. The paper ends by reviewing some practical and logistical issues from both an administrative and pedagogical perspective, that need to be considered when implementing text-comparison software for student use at the institutional level.

Key terms: academic integrity; active engagement; authenticity; originality, paraphrasing and plagiarism; text-comparison software for students

Background

The following paper provides background information for the presentation that will be delivered at the 5th International Plagiarism Conference (Gateshead, July 2012), where findings from the study on student use, but primarily student perceptions of value of text-comparison software, will be presented and discussed in detail. This focus of this preliminary paper is to place the current study in context within the wider literature, and to compare the approaches used and initial findings with similar studies on student use of text-comparison software.

Introduction

For the past two decades (and more), academic literature and popular press have repeatedly focused on the apparent escalating scale of plagiarism within higher education. The cause for this has been attributed to many issues, including increasingly easy access to the internet and the wealth of resources it affords students (e.g. Warn, 2006), the rise in homework and essay-mill sites where work can be shared, bought or sold (e.g. Park, 2003; Atkinson and Yeoh, 2008; Coughlin, 2008; Barratt, 2011), changing cultural expectations and practices of the 'Y-generation' (e.g. Rolfe, 2011), social networking (e.g. Shepard, 2008) and increasing external pressures affecting the time students have available to study (e.g. Postle, 2009; Perry, 2010; Brady and Dutta, 2012), to name but a few. Whether or not levels of student plagiarism have actually increased significantly over this time period, or whether this *perceived* increase is actually down to an improved awareness of plagiarism, more sophisticated methods of detection along with more systematic checks being carried out, is in itself another whole study.

Depending on what literature is reviewed, the number of students openly admitting to plagiarising at least once in their assessed work also varies widely and is on the increase (Barratt, 2011). Some authors have reported relatively low levels with <10% of students admitting to plagiarising in their work (e.g. see various sources cited in Youmans, 2011, p.749), however the majority tend to cite much higher percentages, with typical values in the order of ~20-60% of undergraduate students (e.g. Bennett, 2005; Franklyn-Stokes and Newstead, 1995), while others report staggeringly high values of ~80% of undergraduates admitting to plagiarism in their work (e.g. Greene and Saxe, 1992 as cited in Love and Simmons, 1998; Shepard, 2008). Postgraduate students are also not immune to such practices, with ~40% of students at one US institute admitting to plagiarising in their work (Parry, 2011). The reasons cited by students for their actions are equally wide ranging. For example, in some studies, students expressed the belief that copying directly from the internet was an acceptable practice (e.g. see various sources cited in Rolfe, 2011, p.701). In other studies, the students cited time pressures and the need to take shortcuts to complete their work by the set deadlines as the driver to include plagiarised materials (e.g. Perry, 2010), while others admitted to being reluctant to spend the time needed to carry out the work required first hand (e.g. Fischer and Zigmond, 2011), or explained that as copying, sharing work and cutting and pasting were all common practices amongst their peers, they had decided to follow suit (e.g. Walker, 2010).

Although much of this plagiarism is low key and will certainly not make the 'headlines' of the national media, institutes cannot afford to ignore this type of culturally ingrained poor academic practice, as it can have damaging implications for the institute's reputation, as well as that of its academic staff and graduates (Hunter, 2010). Furthermore, left unchecked poor academic practice can quickly escalate into more substantial causes of plagiarism.

Software detection solutions?

In response to the sense of increasing levels of plagiarism in students' work, many institutes now routinely use text-comparison software (e.g. Turnitin, Copyscatch, Safeguard, EVE, TOAST, Moss etc.) to check the authenticity of work submitted for assessment. Even though all software systems have some inherent limitations and can be time consuming in terms of analysing and acting on the resultant reports (e.g. Batane, 2010; Savage, 2004; Walker, 2010), they are in general perceived as beneficial, offering a more systematic approach towards identifying issues of concern.

Initially, many academics viewed this software as a 'plagiarism-detection' or 'anti-plagiarism' tool that could be used in a disciplinary manner to actively identify plagiarism, enable a punishment to be administered and hence 'educate' the student not to submit plagiarised work in future (e.g. Savage, 2004; Youmans, 2011). There was also a general consensus that the mere act of integrating this software into the university's submissions process acted as a strong direct deterrent to plagiarism (e.g. Dahl, 2007; Ledwith and Risquez, 2008). Used as a 'deterrent tool', many institutes have started to require their students to submit work through the text-comparison software, with some allowing students to subsequently see the outcomes reports after submission while others do not. In other cases, the institute itself runs work submitted for formal assessment through the software after the student

has submitted it. In such cases, students do not routinely get to see the outcomes reports unless there is an issue of concern.

More recently, the terminology used to describe 'plagiarism detection' software has changed, recognising that it does 'detect' plagiarism per se, but offers a means by which different materials can be actively compared with each other. This has led to a preferred name of 'text comparison software', in which the onus to 'detect and confirm' actual cases of plagiarism and poor academic practice resides with the academic and is an academic (not an automated) decision (Batane, 2010; Gannon-Leary et al, 2009; Youmans, 2011). There is also growing recognition that the use of text-comparison software alone does not deter students from submitting plagiarised work. A number of cases have described instances where students have knowingly submit plagiarised work when the software is in use, in the belief that it will not be detected, no action will be taken by the academics or that it is worth the risk compared with non-submission or spending time completing the work appropriately (e.g. Love and Simmons, 1998; Dreuth Zeman et al, 2011; Walker 2010; Youmans, 2011).

In his paper on plagiarism software, Warn (2006, p.196) recognised that:

"Although tertiary institutions can employ software tools to detect this cut and paste plagiarism, a policy based primarily on software-based detection will not change the learning behaviour of students."

This illustrates the need for additional actions over and above the implementation of reactive software to 'detect' cases of plagiarism, if student attitudes, practices and understanding of appropriate writing skills, are to be challenged.

As a consequence, a number of universities have started to make text-comparison software available to their students in a formative and educational manner, in an attempt to address inadvertent plagiarism and improve writing practices. In some cases, this takes the format of granting students access to the text-comparison software to check and revise drafts of their work prior to formal submission (e.g. Brick, n.d.; Rolfe, 2011; Whittle and Murdoch-Eaton, 2008). In addition to improving practices and awareness of plagiarism, Rolfe (2011, p.707) recognised that used in a formative manner, providing students with the option to use text-comparison software themselves "...initiated a cognitive process, and students claimed that this made them think about their writing." She went on to describe how comparisons between draft and final submissions showed the students were identifying sections of copied and 'patchwork' plagiarism, and rewriting these in their own words. Similar positive outcomes and evidence of repeat editing of work to remove instances of copied text and plagiarised paraphrasing were noted in a study from a US institute (Parry, 2011).

Other institutes allow students to see the outcomes reports from checks carried out by the institute, and provide formative support and guidance, encouraging students to revise and resubmit work when plagiarism has been identified (e.g. Gannon-Leary et al, 2009), while in other cases students can review outcomes reports for their own work or anonymised peer work and use this to inform future submissions (e.g. Dahl, 2007; Ledwith and Rísquez, 2008). These approaches are credit with encouraging students to review their practices, seek additional support and guidance on expected writing conventions, and become more aware of and simultaneously less tolerant of plagiarism in work submitted for assessment.

Institutional context – the drive to use text-comparison software

A major institutional review was undertaken to revise and update the UK Open University's (UKOU) plagiarism policy and its procedures for dealing with any cases of academic misconduct that came to light. This was carried out with three primary objectives in mind: *deterrence* through the establishment of a clear policy and set of penalties to be applied in the case of identified plagiarism; detection by embedding the use of text-comparison software into the assessment process for systematic checking; and education by developing a series of all-encompassing learning resources to promote good academic practice.

Given that the UKOU operates in an online and distance learning environment, and comprises of eight faculties (with ~1200 academic staff), 14 administrative centres (containing ~3500 support staff) and

~7000 associate lecturing staff, who are all supporting ~260 000 undergraduate and postgraduate students based around the world, on ~570 modules, consistency and transparency in practice are paramount.

Following implementation of the new policy and procedures, it quickly became apparent that the vast majority of potential cases being highlighted by the software checks and due to greater awareness of plagiarism issues by staff, comprised of low level issues due to poor academic practice, misunderstandings of expected conventions and culturally engrained practices that differed to those expected by the institution. These typically consisted of inappropriate paraphrasing, missing or incomplete in-text citations and references, missing or unclear quotation marks, inclusion of the occasional matched sentence or long phrase and so forth.

Typically, when students were contacted about such issues either informally by their tutors or other academic staff, or as part of a formal (and potentially disciplinary) investigation, although a few admitted and/or accepted their work did not conform to expected academic practices, the vast majority resorted to highly emotive language, expressing expressed shock, surprise and despair at being 'accused' of poor academic practice, plagiarism or cheating. (At no point did communications with students ever suggest that they were cheating; this was a term they themselves would use in response to neutral investigations.)

Education is all about developing skills and understanding, and as such there is an intrinsic obligation to ensure students can develop their academic writing skills appropriately. Experience shows that ignoring minor cases of plagiarism can reinforce this poor academic practice in the student's mind, resulting in increasing occurrences of inappropriate practice in subsequent work, and cries of appeal from the student that no one has ever commented on this issue before. Dealing with the number of low level cases of plagiarism while simultaneously addressing more serious cases, all takes time, effort and result in undue concern both for the student and the academics involved. Therefore as part of the 'detection and education' process, the institute sought to identify some means by which students could take more responsibility for checking the authenticity of their work and ensuring it complied with expected academic practices. The key object was to develop a system whereby students would feel more confident about their work, could actively and independently address minor slips in academic integrity and be able to submit their work in the knowledge that their assignments were written and reference appropriately.

Methods of investigation

The UKOU currently uses two forms of text comparison software – Turnitin (to enable checks against publically accessible resources on the internet) and Copycatch (used to check for cases of collusion between student submission on a particular and past cohorts, and/or to check for plagiarism from set module resources). Although considerations were initially given to allow student access to both forms of text-comparison software, the concept of 'Copycatch for students' was quickly dismissed, as it was not permissible to allow students access to submissions from the same or previous cohorts of students on each module; this would have limited this system to checking against module specific resources. In addition, it was felt that complexity of interpreting Copycatch outcome reports would be off-putting to student use.

As such, the UKOU opted to investigate the potential of 'Turnitin for students' (referred to as Tii4S). Once a file has been submitted to Turnitin, an 'originality report' is created, with this comprising of a colour coded 'similarity score' representing the cumulative percentage of text matched to different sources. Within the report, the user can view each match sequentially (with highest percentage matches listed at the top of the report), and directly compare the 'original' text with that included in the assignment. Various filters can be set to exclude matches below a certain percentage or number of words, bibliographic material and quotations, as a means of removing common forms of spurious matching, allowing a more accurate indication of potential matched text of concern.

Turnitin has been designed to allow either a single submission per class or to enable multiple submissions (with this restricted to once every 24 hours and where each submission overwrites the previous, so that only one report is available at any one time). In both cases, the originality report can

be released immediately to the user, after a specified 'closing date' or not at all. For any other number of submissions, separate submission dates need to be set up, adding to the administrative tasks involved. Full details about this system can be found on the Turnitin website (see 'Originality check' http://www.submit.ac.uk/en_gb/products/originalitycheck).

Participants

The study involved a series of self-selecting students from across nine postgraduate Science modules, delivered entirely online in a distance learning environment. The students varied in terms of i) age (from 20 to >65 years); ii) physical location and hence past learning cultures and expectations (i.e. based within the UK, the rest of Europe and/or globally); iii) prior learning experiences (including students new to postgraduate study and/or new to the university; experienced students, who had completed at least one postgraduate module through to individuals who had already completed another postgraduate qualification in science and/or other disciplines; individuals direct from undergraduate study or recent formal studies, to those who had not studied at any level for a number of years); and iv) motivations/reasons for studying (e.g. individuals working within a scientific context seeking professional development, to those hoping to enter a scientific profession, or studying out of interest).

Advice on academic literacy skills and avoiding plagiarism

Irrespective of module of study, all students on the MSc programme are advised about the university's policy on plagiarism at the beginning of the module and prior to submitting each assignment. Students are also expected to work through introductory material at the beginning of each module on developing good academic literacy skills (and in turn, how to avoid plagiarism), with this delivered in a discipline specific framework to maximise relevance to student learning. In addition, students have access to a series of generic study skills resources aimed at undergraduate students (e.g. *Developing good academic practices* website, see <http://openlearn.open.ac.uk/course/view.php?id=4329> for a publically accessible version of this site) and postgraduate students (e.g. *Key skills for postgraduate students* website). This approach offers a transition between the two levels of study, allowing individuals unfamiliar with either the university's particular approach to academic literacy and plagiarism or the skills and expectations related to postgraduate studies, to familiarise themselves accordingly.

Some of the modules also included formative and/or summative questions within the first assignment, requiring students to actively engage with academic literacy issues, demonstrating their awareness and understanding of how to avoid plagiarism and what was expected in terms of good writing practices within their module.

In addition, as part of this study, all students (irrespective of whether they opted to use the software or not) could access detailed guidance notes on both technical aspects of using Tii4S (e.g. accessing the site, creating an account, uploading a file, retrieving the originality report) and pedagogical issues in terms of embedding the experience in their academic practices (e.g. how to interpret the originality report, determining their validity of writing style, identifying areas and aspects of concern, confirming or adapting practice, etc.). No specific one-to-one or group training was offered to the students on either aspects of using Tii4S.

Study Design

In 2011, the system was set up with restricted access, so that students could only carry out one 'check' per assignment. As each of the modules involved in the study had a different number of assessment points (ranging from four to eight separate assignments) all due on different dates, a unique series of submission periods were set up for each module. Each submission period opened and closed sequentially, closing on the submission date for an assignment, with the next submission period opening the following day. Upon submission of a piece of work, the originality report was released to the student for their review. Any further submissions were then delayed until the next submission period opened. Any point in time, students could only see the open submission period. This approach was time intensive for the administrator, in terms of setting up a series of open/close dates, the duration and number of which, were unique to each module and needed to be aligned to the assessment schedule.

Following feedback from the students that single submissions were too restrictive, in 2012 the system was adapted to trial a more flexible system, whereby each of the submission periods were set to open at module start, closing sequentially on each assignment 'due by' date. In addition, two 'spare checks' were set up, with these open for the duration of the module. Although students were still restricted to one check per submission period, they had the option of using one, some or all of the open periods as and when they wished. As in 2011, the originality report was released to the student upon submission of their work.

In addition, two of the seven modules in 2012 were set up to allow multiple submissions through Tii4S. This was done to primarily to check whether students would make avail of the opportunity to repeatedly check their work with the software.

Student and staff questionnaires, discussion and interviews

In 2011, students were asked to complete a short online questionnaire comprising of a series of fixed response option questions and some open text questions, focusing on the ease of use and perceived impact of this system on their academic practices. In addition, a discussion forum was opened to allow more discursive interactions between students and staff, and so obtain a broader insight into their thoughts and understanding of general issues relating to plagiarism and good academic writing practices, as well as the perceived value of the software in relation to their learning progression. The discussion forum was open to all students and staff irrespective of whether they used Tii4S or not.

In 2012, in addition to the online questionnaire and discussion forum, individuals were invited to participate in a series of structured interviews.

The primary objectives of this study were therefore to determine:

- 1) whether students would use text-comparison software to self-check work prior to submission (and if so, which type of student was most likely to use it);
- 2) the ease by which students could use the system and interpret the outcome-reports
- 3) what the impact of offering unlimited access to the software would be on student use and behaviour compared with a more restricted system;
- 4) the impact on student writing, in terms of perceived and actual changes in practice. (This is not discussed further in this paper, but will presented in a separate paper.)

Preliminary Findings

Student uptake

Prior to the study commencing, students were advised that Tii4S was offered on a formative, self-directed basis and that there would be no direct staff intervention. They were also advised that no action would be taken by the institute on the reports generated, and that these were for the individual student use only. They were also informed that submitting work to Tii4S was separate to the formal submissions process used across the institute, and that irrespective of whether they had used Tii4S or not, their final submission work be automatically checked by one or both of the text-comparisons used within the institute.

In 2011, a total of 120 students (out of a possible 613; ~20%) from eight postgraduate modules, used Tii4S at least once, with the number of students per module ranging from 2 to 42. A total of 81 students (out of 551; ~15%) from seven modules involved in the 2012 study have used Tii4S at least once (with this ranging from 2 – 29 students per module). Additional students are expected to join the 2012 study, as the academic year progresses and more assignments are due for submission. There were no restrictions on numbers of students opting to use Tii4S, therefore the cohort who have participated should be viewed as self-selecting, and may or may not be representative of the entire cohort.

Student use of Turnitin for students (Tii4S) – questionnaire feedback

To date, a total of 26 students (13%; n = 201) who have actively used Tii4S at least once, have completed the online questionnaire. Given the small number who completed the questionnaire, the following

results should be viewed subjectively, but can be taken as an indication of student perception of the text-comparison software and its potential value to their learning.

85% of the respondents perceived the system as useful to their studies, while 88% found it relatively straightforward to use. Although 58% of the students were content with outcomes report and how to interpret the results, 19% stated a need for some additional support and guidance in interpreting the results, while 23% stated they either did not find the report helpful or felt unable to interpret the result in the context of improving their academic practices. Half of the students stated that process had confirmed to them that they were following good academic writing practices, while 15% went further and attributed a positive change in their writing practices to using the system. In terms of understanding plagiarism and the institutional policy, use of the system prompted 19% to actively review the policy to ensure they were fully aware of all aspects of plagiarism, with some confirming a change in their writing practices as a result. 96% of the students stated they intended to use the system again, of which 65% expressed an interest in using it as often as possible.

The questionnaire also elicited open comments on the system and process of using Tii4S. These were reviewed and coded as positive, neutral or negative statements, or suggestions for change. Typical responses are shown in Table 1.

Table 1: Example of some of the common types of open responses received from students via the online questionnaire, reflecting on their experience of using Tii4S, and compared with the perceived usefulness of the system and the likelihood of them using it again. (Data compiled from 2011 and 2012 responses)

Student open comment	Comment coding	Perceived usefulness	Future usage
The supplied guide explained the features of Turnitin clearly including the range of usefulness and limitations of software.	Positive	Very	Definitely
I think it is an excellent resource, but for those that plagiarise, it may be a tool to identify where they will get caught and which bits they need to change. However, I would value the service in order to know that everything I write is original and not subconsciously worded in the same way as someone before.	Positive (self) /negative (others)	Very	Definitely
The system acts as assurance that my assignment submissions are acceptable. I [checked] any result that seemed to demonstrate higher than usual degree of similarity...and would amend as necessary	Positive	Partially	Definitely
Very useful in that it has confirmed that I am not accidentally plagiarising – this has always been a concern of mine. Would use it again to check work before submission as it gives reassurance.	Positive	Partially	Possibly
A useful device but it needs tweaking to make it user friendly	Suggestion	Very	Possibly
...useful if multiple submissions were allowed	Suggestion	Partially	Possibly
I am not sure that the option to alter the script based on Turnitin output is useful... Providing the output as part of the marked assignment would allow the student to learn from any mistakes... and allow the tutor to emphasis or highlight significant parts.	Suggestion	Not	Possibly
The software failed to pick up a section of text I used and referenced. <i>[Note: This was to a set module book, not available online.]</i>	Negative	Very	Definitely
I found the whole process incomprehensible <i>[Note: irrespective of the negative experience, this student was keen to use the software whenever available.]</i>	Negative	Not	Definitely
Time could be wasted trying to score less or change things that were not plagiarised but happened to be similar to certain public sources. ...the system feels like a game which people will try to	Negative	Not	Possibly

'win'. It seems to detract from the importance of the plagiarism issue and particularly from the academic learning and process.			
I appreciate the offer of transparency... However, I am not sure if this is a useful step in the preparation of [an assignment]. Without knowing exactly how this output is used by the [academics], it is hard to know what the results really represent.	Negative	Not	Possibly
The whole logging process is laborious.	Negative	Not	No

Student perception of Turnitin for students (Tii4S) – discussion feedback

Students who participated in the discussion forum were in general, different to the cohort who completed the questionnaire. The discussion forum attracted contributions from students who had used Tii4S (and had positive and negative experiences), others who interested in using the software but cautious to do so for various reasons, students opposed to the concept of student access to text-comparison software, and a number of staff.

The comments within the discussion forum typically mirrored those received via the questionnaire. The majority of students viewed the software as intuitive in terms of use, interpretation, and relevance to their academic writing development (both in terms of building confidence in current practice and highlighting 'inadvertent plagiarism that can then be corrected'). In addition, there was evidence of depth of thought regarding the application and integration of the software checks within individual's practice, e.g.

"It [Tii4S] doesn't tell you if you have plagiarised, it just points you to places where you might have...it gives you an indication if your terminology is following scientific convention. I will be using it for my next [assignment]."

As with the questionnaire responses, a minority of students did find the system cumbersome, and clearly expressed views that the perceived personal value of using the system was insufficient to offset the amount of time needed to use the system. These students typically described how the originality report was revealing <10% similarity, and upon checking much if not all of this could be dismissed as spurious matching. Rather than viewing this as confidence building and confirmation that they were applying good academic practices as others with similar low and spurious matching were doing, these students were very focused on the time-commitment involved in using the system, and the lack of 'positive' results (i.e. large matches).

One individual who had not used the system, but who had very strong and emotive views about good academic practices and the use of text-comparison software by students, stated:

"I've been an [institute] student for 8+ years, and there's never been the remotest suggestion that I've plagiarised anything... Shockingly, I've managed to do this without needing to use Turnitin ...the idea that other people are trying to or actually getting away with it [plagiarism] (or using a professional essay writing service), I find this sort of thing quite annoying."

The student went on to add

"Part of the point of learning to write in academic mode is learning to maintain your citations and quotes; if we start making it easy for people to notice they've missed a couple of citations, or failed to put quotes around entire paragraphs from books, why should I bother learning the discipline of doing it correctly?"

In another contribution, the same student expressed a strong desire for "...the cheats to be caught" by the institute, and that the focus should be on students developing their academic writing skills, not being prompted to check for omissions and poor practice.

Discussion of findings

Student uptake of text comparison software

To date, student uptake has been very low. This could be an indication that the target students already possess a high level of confidence in their writing skills and so do not feel the need to check their work (as indicated by one student's contribution to the discussion forum). This view would complement the findings of Walker (2010) who discovered that distance learning, experienced, mature students were less likely to plagiarise, compared with younger, campus-based students reaching the end of their undergraduate studies. Although plausible, more likely reasons for the low usage may include: i) a lack of awareness of this resource, how to access it as well as a lack of understanding of how it could benefit their learning; ii) students forgetting about its existence when preparing their assignments; iii) time pressures prohibiting actions that could result in potentially more work for the student; or iv) reluctance by the student to actively check their work and potentially discover inconsistencies in their academic practice.

Formal checks carried out by the institute consistently reveal relatively low raw percentage similarity rates for science postgraduate student in general (with the mean value dependent on the assignment questions and discipline of study). However, when compared with the range of matching identified within the student generated reports, examples of high matching (in this case >30%) or zero-matching (not generally expected due to the nature of the postgraduate assignments), are typically absent from Tii4S. Although extreme level matching in the formal checks only equates to a few scripts at most for each assignment, their absence is noticeable within Tii4S. This implies that students who have already attained good academic writing skills, are more likely to carry out self-assessment checks with the majority of apparent matching due to use of scientific terminology, references and citations and quotations. The students who are more likely to include plagiarised material in their scripts (as indicated by the formal checks) are not currently availing of Tii4S.

Perceived ease of use

Although the majority of students felt Tii4S was easy and intuitive to use, a small number did struggle in terms of uploading files, finding and downloading the outcomes report and then working with it. The technical issues can be addressed by reviewing the guidance notes, emphasising key points that some students appear to have omitted or missed, while trying to use the system. Additional induction resources such as an automated slidecast may also help 'talk' students through the process in a more coherent manner.

As with other studies, a number of students expressed some confusion and concern about the originality report. On several occasions, students commented that they had interpreted the term 'originality report' and associated percentage as the amount of *original* material in their draft assignment rather than amount of matched/similar text, and hence were initially concerned when receiving reports of 3%, 5%, 10% and so on. Most of the negative experiences expressed by students related to the extent of spurious matching to specific names, technical and scientific terminology, citations, references and quotations and other spurious materials. Even when the inbuilt filters were used, many found that the reports were still picking up quotations and references, due to different formats used to those recognised by Turnitin. Some students queried why Turnitin did not identify some closely paraphrased to directly quoted material in their scripts, with this leading to a loss of confidence in the reliability of the software.

The most common concern and impact on student use of the outcome reports however, was uncertainty regarding acceptable threshold matching, as indicated by student comments in the discussion forum and questionnaire. Unlike other institutes that have defined different levels of similarity matching deemed to be acceptable or that will culminate in some form of action such as grade penalties or the requirement to resubmit work (Ledwith and Risque, 2008; Gannon-Leary et al, 2009), thresholds are not used in this institute. This is because experience has shown that the extent of acceptable/unacceptable matching varies depending on the discipline of study, structure of the assignment and format of questions used. Setting thresholds can also lead to a false sense of security with the student focusing on the overall percentage similarity, rather than considering the type and extent of each section of matched text identified in their script, e.g. an overall percentage of 10% may not appear of any concern, however if this occurs as a single block of unattributed text, then some form of revision will be required. Further guidance is needed to help students gain confidence in reviewing their scripts and using the originality report to determine authenticity of their work and consistency in acknowledging sources used.

Unlimited versus restricted access

Initial proposals to grant students access to the text-comparison software raised concern amongst some academics, worried that rather than encourage students to develop a deeper understanding and awareness of good academic writing practices, it would encourage a more strategic and superficial approach, whereby students would use the software to 'tweak' plagiarised text until it was no longer detectable, rather than applying good writing practices. Warn (2006, p.196) expressed similar concerns about potential increasing levels of plagiarised paraphrasing, stating:

"The trajectory behaviour encouraged by the software is for students to increase the amount of paraphrasing and tweak the level of direct copying until it falls under the sensitivity of the software detection tool. In effect the end-result is that students will become adept at 'Going under the radar.'"

Indeed, in one US study, students who were provided with unlimited access to text-comparison software were found to "...keep resubmitting it [assignments] and working on it until it gets appropriately in their own words, or in quotations, or cited" (as quoted in Parry, 2011). What is unclear from this description, is whether these students continued to follow the content and structure of the original sources being used, merely changing a few words or replacing them with synonyms, until the software no longer recognised the match, or whether they dissected and analysed the original text, presenting their interpretation and synthesis of the work in their own words. The former approach does not indicate any depth of understanding by the student and still constitutes plagiarism; the latter approach is the ideal that all academics want their students to attain – the ability to work critically with sources of information and construct unique answers that demonstrate their knowledge, awareness and understanding of the topic being assessed.

Concern regarding the potential for the inappropriate use of Tii4S with unlimited submissions, resulted in one student stating:

"I don't want to be a spoilsport but more than one go? Wouldn't that just make it easier for those trying to 'work the system' to their own advantage? e.g. plagiarise to your heart's content, use Turnitin, make changes, use Turnitin, repeat as required. Perhaps Turnitin could report to tutors how often a script has been submitted?"

Other students concurred with the point of view, stating that a single submission option meant they had to think about when they planned to submit a draft for checking and then actively review the outcomes report to ensure their work complied with expected practices. The general consensus was this approach helped the students think about stages in the drafting process and consider the point at which 'feedback' from Tii4S would be of most use to them in completing the work. It was also felt to help with

time management issues, as submitting a draft through Tii4S too close to the formal submission date would not leave sufficient time to complete any revisions and amendments needed.

A middle ground that restricted the total number of submissions from a student but allowed a revised draft to be checked for a second time, was deemed by some as the most helpful model in terms of developing writing skills and offering some additional reassurances (especially if the first draft check revealed what the students perceived as substantial matching).

Another concern flagged in some studies is the ability for students to misuse the software to their advantage. Parry (2011) described the potential for students to use text-comparison software to screen obscure articles to check their similarity score, and hence determine the likelihood of being 'caught' if they then submitted this work as their own.

To date, there has been no evidence of the misuse of Tii4S, with student either setting up multiple accounts to get round the single submission option or running files other than their draft module assignments through the software.

Concluding statement

This is a relatively small study that is very much still in progress, limited to specific cohort of students (postgraduate) from a non-conventional study environment (online and distance learning). That said, when compared with other studies on the formative use of text-comparison software (specifically Turnitin) with students, the results concur. Students are generally positive about the use of text-comparison software, stating that it boosts confidence in practice and allows them to recognise and resolve any inadvertent plagiarism in draft version of their work, prior to formal submission.

To date, uptake of the system has been disappointingly low, with only 15-20% of the student cohort actively using the software. The reasons for this are not yet apparent, but could be due to a number of separate or confounding variables.

For this particular cohort, there has been no evidence to date of misuse of the system, with students subverting submissions by setting up multiple accounts, or repeatedly submitting successive drafts of work and 'tweaking' areas of concern until they are no longer detected by the software. In addition, the students themselves have recognised the potential temptation to successively edit their work until it falls within a perceived acceptable threshold, when unlimited access to the system is allowed. Instead, these students have so far indicated a preference for a more restricted system with one draft submission permitted for each assignment, but with the option for a very limited number of 'additional' checks.

Although most students found the system intuitive to use in terms of uploading work and accessing the outcomes report, there is clear evidence that additional self-service guidance resources linked to using the system and interpreting the reports would be advantageous. In addition to the structured written guidance notes, a slidecast taking students through each step of the process and reviewing different types of plagiarism commonly identified by the software should be developed.

Whether the outcomes of this study (with postgraduate science students) can be directly applied to meeting the needs, expectations and behaviours of other postgraduate and undergraduate students, is not certain. Although there may be potential for a disparity in behaviour between undergraduate and postgraduate students, given the similarity in outcomes with other studies that worked with undergraduates (from first to final years of study) and postgraduate students from different disciplines, this may not be an issue. Once this current study has been completed and recommendations made in terms of the support materials, access levels, frequency of use and how this tool should be integrated into the student's formal learning, then the next stage will be to trial it with different categories of

undergraduate students and compare the outcomes, and in particular the perceived and actual change in student behaviour.

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